State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

DRAFT LAND MANAGEMENT PLAN

for

BUTTONWILLOW ECOLOGICAL RESERVE

SEPTEMBER 2004

Buttonwillow Ecological Reserve Draft Management Plan

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I. INTRODUCTION

A. Purpose of Acquisition

Buttonwillow Ecological Reserve occupies 1,347 acres of relatively undisturbed Southern San Joaquin Valley natural land. The property was acquired to protect prime habitat for several listed plants and animals. The San Joaquin kit fox (*Vulpes macrotis mutica*), San Joaquin (Nelson's) antelope squirrel (*Ammospermophilus nelsoni*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) and blunt-nosed leopard lizard (*Gambelia sila)* are all the known to use the site, in addition to several other sensitive animal species. Hoover's starflower (*Eriastrum hooveri*), lesser saltscale (*Atriplex miniscula*), and thriving stands of iodine bush (A*llenrolfea occidentalis*), saltbush (*Atriplex* spp.), and alkali sacaton (S*porobolus airoides*) are scattered throughout the property. Little uncultivated land of this quality remains in the vicinity, and the abundance and diversity of sensitive species makes it critically important to protect and adequately manage.

B. Acquisition History

The North River Sanitation District (NORSD)initially acquired the property from the Tenneco Corporation in the late 1980's to serve as a wastewater disposal site. When it became apparent that there were significant T&E species values on the site following a biological assessment, the NORSD was advised by their consultant to locate other more suitable property for their wastewater and find a conservation-oriented organization to purchase the property (DFG 1989). Rick Hewett, the San Joaquin Valley field representative for the Nature Conservancy, negotiated with NORSD to sell their property. The Wildlife Conservation Board (WCB) purchased the property that became Buttonwillow ER from the North of the River Sanitation District (NORSD) in February 1991.

C. Purpose of this Management Plan

1) Guides the management of habitats, species, and programs described herein to achieve the department's mission to protect and enhance wildlife values.

2) Serves as a descriptive inventory of fish, wildlife and native plant habitats, which occur on or use this property, and outline appropriate public uses of these resources.

3) Provides an overview of the property's operation and maintenance, and personnel requirements to implement management goals.

4) Serves as a budget planning aid for annual regional budget preparation.

5) Provides a description of potential and actual environmental impacts and subsequent mitigation, which may occur during management, and contains environmental documentation to comply with state and federal statutes and regulations.

II. PROPERTY DESCRIPTION

A. Geographical Setting

Buttonwillow Ecological Reserve is depicted on the Buttonwillow 7.5 minute U.S.G.S. quadrangle, approximately 22 miles west of Bakersfield in Kern County (Figure 1). The property is generally bisected by Seventh Standard Road and is approximately 3 miles east of Interstate-5. The seasonally inundated Jerry Slough channel runs through a portion of the property, creating flooded areas in spring months that support vernal pool species and provide a foraging site for wintering shorebirds.

B. Property Boundaries and Adjacent Land Use

The 1,347 acres that currently comprise Buttonwillow ER are made up of a few separate but contiguous parcels in Sections 29 and 33 of T28S, R24E and Section 3 of T29S, R24E (Figure 2). Surrounding land use is primarily agriculture, although some natural habitat remains adjacent to portions of the ER. A house with farm animals is located on the western side of the primary road that leads into the north side of the ER from 7th Standard Road. Some impacts from this residence to the ER are visible across the road from the house, such as cleared habitat, trash and signs of trespass grazing from the resident goat herd. Fencing the boundary should decrease or eliminate these impacts.

Parcel number	**Location**
88-220-01 – 636 acres	Section 33, T28S, R24E
88-200-08 – 320 acres	East ½ of Section 29, T28E, R24E
103-020-01 – 391 acres	North ½ of Section 3, T29S, R24E
Same as above	North ½ of the SE ¼ of Section 3, T29S, R24E

The majority of the property is in a relatively undisturbed state; however, occasional signs of tillage, soil and water manipulation are present, especially in the southern half of Section 33 (Figure 3). Vegetation in these areas is mature, and of a late seral stage, suggesting that the disturbances occurred quite some time ago. Although the vegetation in these areas has recovered, berms are still prominent and continue to direct water and influence the vegetative structure.

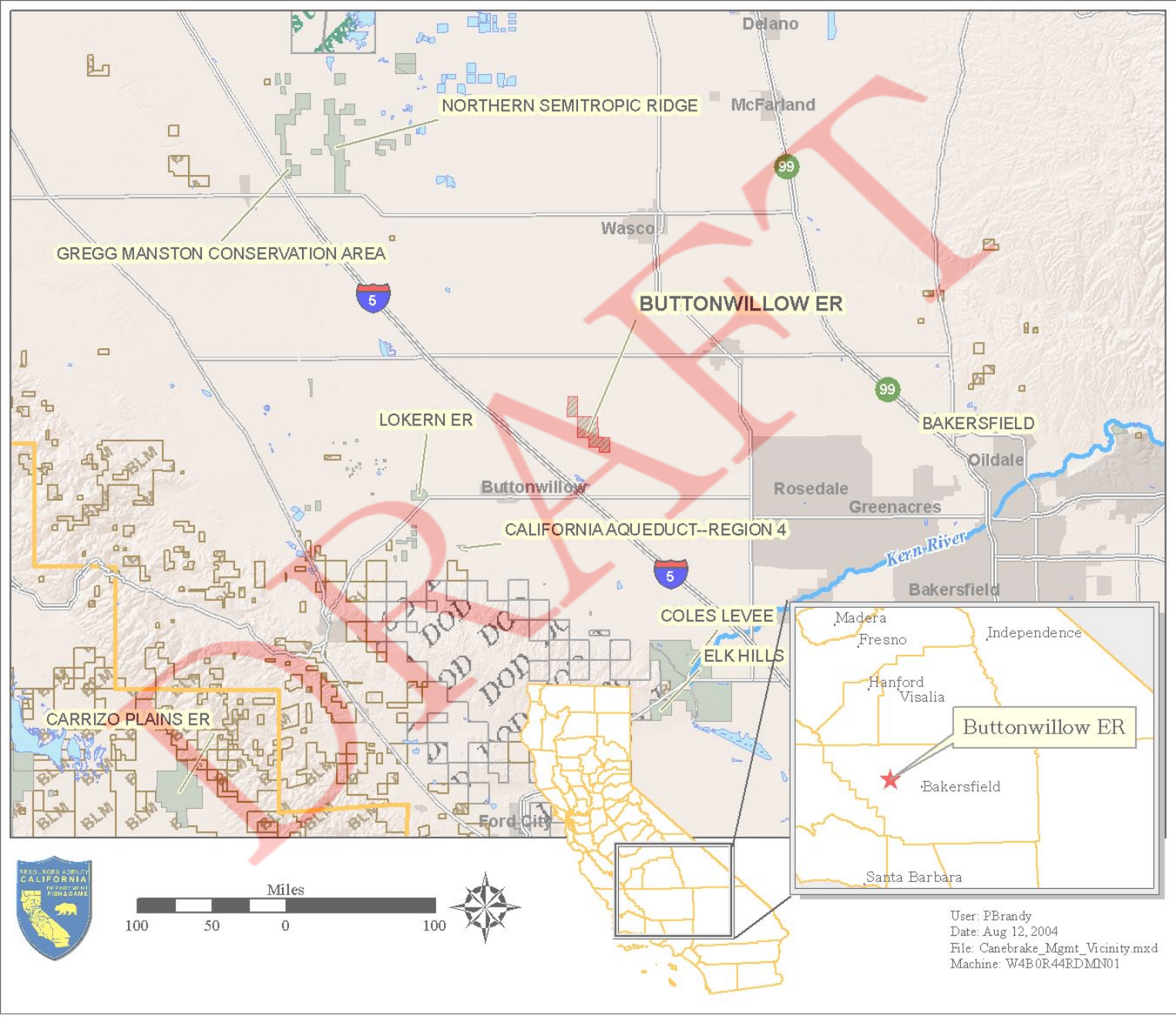
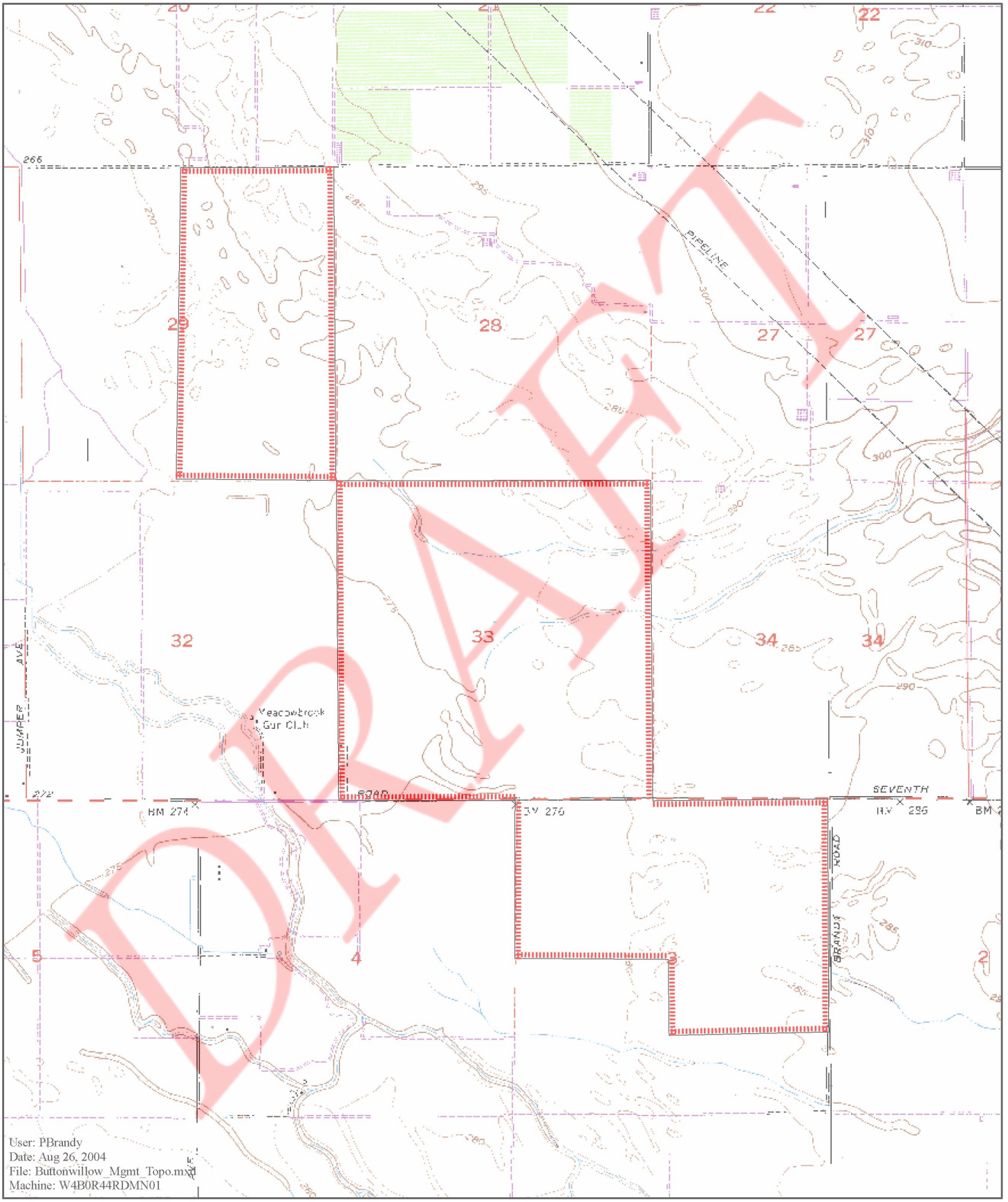

Delano
NORTHERN SEMITROPIC RIDGE
McFarland
99
Wasco
GREGG MANSTON CONSERVATION AREA
5
BUTTONWILLOW ER
99
LOKERN ER
BAKERSFIELD
Oildale
Buttonwillow
Rosedale
Greenacres
CALIFORNIA AQUEDUCT--REGION 4
Kern River
5
Bakersfield
COLES LEVEE
ELK HILLS
DOD
CARRIZO PLAINS ER
BLM
Ford City
Madera
Fresno
Independence
Hanford
Visalia
Buttonwillow ER
Bakersfield
Santa Barbara
Miles
100
50
0
100
User: PBrandy
Date: Aug 12, 2004
File: Canebrake_Mgmt_Vicinity.mxd
Machine: W4B0R44RDMN01

Figure 1. Buttonwillow Ecological Reserve Vicinity Map



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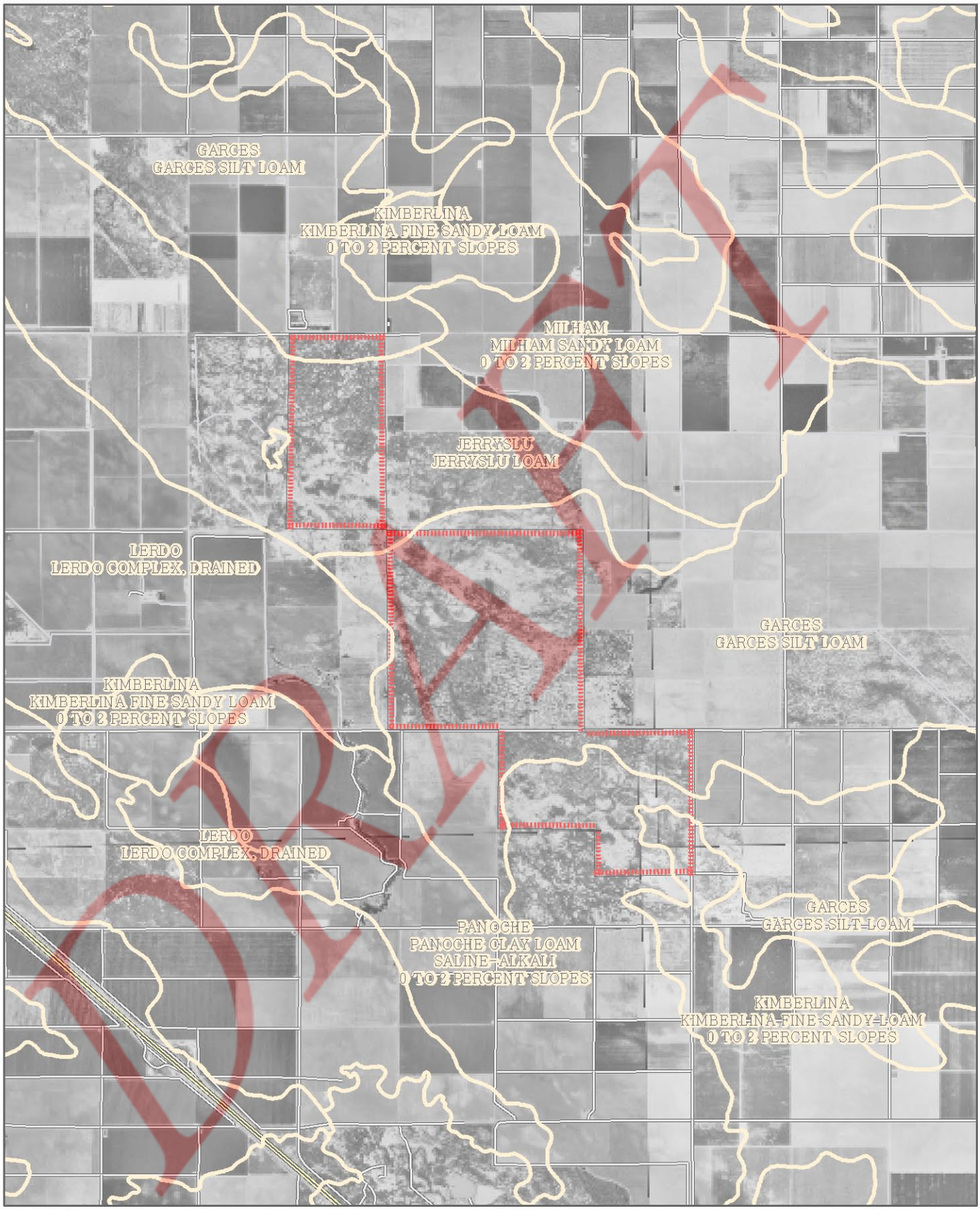
File: Buttonwillow_Mgmt_Topo.mxd
Machine: W4B0R44RDMN01

Includes All or Portions of:
Township 28S Range 24E Sections 29, 33;
Township 29S Range 24E Section 3.

Miles
0.5 0.25 0 0.5

Figure 2. Buttonwillow Ecological Reserve Property Boundaries and Topography



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File: Buttonwillow_Mgmt_Soil.mxd
Machine: W4B0R44RDMN01

Image dates 1994
STATSGO Soils

Miles
0.5 0.25 0 0.5

Figure 3. Buttonwillow Ecological Reserve Soils

Trespass grazing by sheepherders has been an ongoing occurrence in recent years. Signs of disturbance by sheep are visible throughout the property, with some areas indicative of heavy use. Debris is scattered throughout the property, though a few areas are highly concentrated with debris, specifically, the northern edge of Section 29, and along the western border of Section 33. The southern portion is also affected. Frequently observed items include tires, auto parts, barrels, livestock carcasses, appliances, furniture and water tanks. Hazardous materials may also be present. Illegal dumping is likely a relatively recent problem on the ER since no references to the problem were found in any DFG documents relating to the acquisition, description or intended management of the property.

C. Geology, Soils, Climate and Hydrology

Five soil series are used to describe Buttonwillow ER soils (Soil Survey Staff, NRCS 2004), which are derived from granitic, sedimentary or calcereous alluvium (Figure 3).

Garces silt loam is the most extensive of the soil series on the ER. Garces silt loam series consists of deep, well-drained saline-sodic soils. This series typically occupies alluvial fans and terraces, with slopes ranging from 0 to 2 percent. This soil is well drained, with very slow permeability. Scattered saltbush and annual grasses grow on this soil series.

The Jerryslu series occupies acreage in the northern portion of the ER. The soils are moderately deep to a lime-silica duripan, moderately well drained and saline-alkaline in chemistry. These soils are derived from granitic alluvium and occur on nearly level slopes. This series is moderately well drained with slow permeability to the duripan, and are taxonomically described as fine-loamy. Ponding occasionally occurs at the surface.

The Kimberlina series soils are derived from granitic and sedimentary alluvium. They are described as coarse-loamy, and occur on floodplains and alluvial fans. The soils are deep, well drained, with slopes of 0 to 9 percent.

The Milham series is found on the southern portion of the ER. The Milham series is a deep, well-drained soil formed in mixed calcereous alluvium derived from granitic and sedimentary rock. This soil typically occupies alluvial fans and plains that have slopes of 0 to 9 percent, and is described as fine-loamy.

The Panoche series is also found in the southern portion of the ER. Soils are deep, well-drained on alluvial fans and flood plains. They are derived from calcareous, sedimentary alluvium. This soil is moderately alkaline in chemistry, and is described as fine-loamy.

D. Cultural Features

Although the Yokuts inhabited this region of the San Joaquin Valley for centuries before the arrival of Europeans, there are no known archeological features on Buttonwillow Ecological Reserve. However, nearby historical landmarks such as the lone Buttonwillow (*Cercocarpus occidentalis*) remain off of Highway 58 near the town of Buttonwillow,marking an ancient Yokut meeting place. The Tulamniu Village site was occupied by the Yokuts for centuries before being renamed Buena Vista by Spanish Commander Fages in 1772. It's possible the Yokuts passed through the Buttonwillow ER area as well.

Remnants of what was once a house remain on the southern edge of the middle portion, on Seventh Standard Road. The age of the house is unknown, however, it is not likely a historical landmark.

III. HABITAT AND SPECIES DESCRIPTION

A. Vegetation Communities, Habitats and Plant Species

Plant communities and habitats that occur on the ER were classified using the Manual of California Vegetation (Sawyer-Keeler Wolf 1995). The "Preliminary Descriptions of the Terrestrial Natural Communities of California" was also consulted (Holland 1986). A complete list of common plant species that may occur on the ER can be found in Appendix A. The list was developed largely from a botanical survey funded by the U.S. Bureau of Reclamation that was conducted in 1999 and 2000 (McCormick 2001).

Buttonwillow ER is comprised of a mosaic of plant communities, especially of those dominated by alkali-tolerant shrubs of the Goosefoot family (McCormick 2001). Distinct vegetation community differentiation frequently occurs in response to changes in local microtopography. Soils of the site vary from heavy, alkaline clays of playas to loamy soils of an alluvial fan. While the terrain is generally flat, microrelief is abundant throughout the area, providing potential denning sites for the San Joaquin kit fox and precinct sites for the Tipton kangaroo rat. Alkali playas are abundantly distributed throughout the area, providing good foraging habitat for reptiles, including the blunt-nosed leopard lizard and coast horned lizard. Elevation ranges from under 270 feet in the southeast, to over 285 feet in the northwest.

The Mixed saltbush series is distributed intermittently throughout the ER (Sawyer, Keeler-Wolfe 1995). Allscale (*Atriplex polycarpa*) and spinescale (*A. spinifera*) share dominance and frequently intergrade into differentiable, single-shrub dominated stands. Ground cover varies within these stands, with red brome (*Bromus madritensis* ssp. rubens), filaree (*erodium cicutarium*), California

goldfields (*Lasthenia californica*), and peppergrass (*Lepidium spp.*) present in varying degrees. Sites with this plant community are typically found on rolling alluvial fans, or perched above drainages. They may be intermittently flooded or saturated.

Iodine bush (*Allenrolfea occidentalis*) series (Sawyer, Keeler-Wolfe 1995) vegetation dominates the canopy in many parts of the ER. The understory is composed of red brome and filaree. Iodine bush and bush seepweed are tolerant of the alkaline conditions frequently accompanying this community. This vegetation series frequently occurs in heavy, alkaline clays of alkali playas, and intergrades with saltbush species on less alkaline soils.

The Bush Seepweed series (Sawyer, Keeler-Wolfe 1995) is the most widespread plant community on the site. Filaree, red brome, California goldfields, and alkali sacaton (*Sporobolous airoides*) make up the ground cover. A ground layer is frequently absent on heavy alkaline soils of playas, though bush seepweed may still be present. The bush seepweed series frequently intergrades with the mixed saltbush scrub community.

The Alkali Sacaton series (Sawyer, Keeler-Wolfe 1995) occurs in rare abundance in the southern portion of the property, west ½ of Section 3. It is also scattered sporadically throughout the north and middle portions. Alkali sacaton (*Sporobolous airoides*) is the dominant ground layer species, forming large clumps as individuals mature. Bush seepweed and saltgrass (*Distichlis spicata*) are frequently found in the ground layer. Typical sites dominated by alkali sacaton have seasonally saturated alkaline soils.

The Saltgrass series occurs intermittently throughout the ER, along the edges of saturated vernal playas, drainages and areas designed to channel water. It is frequently associated with seasonally flooded soils. Associate species on the ER include sweetclover (*Melilotus indica*), and alkali sacaton (Sawyer, Keeler-Wolfe 1995).

Alkali playas and “scalds” form the underlying matrix adjoining plant communities at Buttonwillow ER. They are low-lying depressions of sparsely vegetated or bare areas ranging in size from a few square feet to over an acre. Playa soils are generally alkaline with high clay content, frequently with a layer of white salty crust over the surface (Holland 1986). Seasonal inundation or saturation often occurs, supporting aquatic invertebrates, crustaceans and plants. Shorebirds may be observed foraging during the wet months. Mammals may also utilize inundated playas as a water source. Reptiles are frequently observed in these open, sparsely vegetated habitats.

Biological soil crusts are an important component of Buttonwillow ER habitats. They are composed of various species of blue-green algae, green algae, mosses and lichens, each of which contributing unique properties to the soil. In general,

biological crust fixes carbon and nitrogen into the soil, thereby increasing their availability to surrounding vascular vegetation. Biological crust also serves as a soil stabilizer, reducing erosion caused by wind and water.

B. Animal Species

Buttonwillow Ecological Reserve is a valuable resource for a variety of wildlife. Small mammals such as the California ground squirrel (*Spermophilus beecheyi*), voles (*Microtus spp*.), deer mouse (*Peromyscus maniculatus*), Botta's pocket gopher (*Thomomys Bottae*), and cottontail (*Sylvilagus audubonii*) are likely common at Buttonwillow ER. These species are important prey items for many birds, including the American kestrel (*Falco sparverius*), northern harrier (*Circus cyaneus*), red tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsonii*), white- tailed kite (*Elanus leucurus*), and barn owl (*Tyto alba*). Facultative and obligate grassland species residing at Buttonwillow ER include the horned lark (*Eremophila alpestris*), savanna sparrow (*Passerculus sandwichensis*), western meadowlark (*Sturnella neglecta*), and burrowing owl (*Athene cunicularia*). A complete list of mammal species likely to inhabit or use the ER can be found in Appendix B.

C. Endangered, Threatened or Rare Species

Table 1. Special Status Species with the Potential to Occur at Buttonwillow ER

Common Name	Scientific Name	Status	Recent Observation?
PLANTS			
Heartscale	*Atriplex cordulata*	CNPS 1B	
Crownscale	*Atriplex coronata var. coronata*	CNPS List 4	
Lesser saltscale	*Atriplex miniscula*	F-SSC CNPS 1B	1999-2000 survey
Subtle orache	*Atriplex subtilis*	F-SSC CNPS 1B	
Lost Hills crownscale	*Atriplex vallicola*	CNPS 1B	
Recurved larkspur	*Delphinium recurvatum*	CNPS List 4	1999-2000 survey
Kern mallow	*Eremalche kernensis*	F-Endangered CNPS 1B	
Hoover's wooly star	*Eriastrum hooveri*	CNPS List 4	1999-2000 survey
	Goodmania luteola	CNPS List 4	1999-2000 survey
	Lasthenia ferrisae	CNPS List 4	1999-2000 survey
San Joaquin wooly threads	*Eriastrum hooveri*	F-Threatened CNPS 1B	

King's gold	*Twisslemania californica*	CNPS List 4	
AMPHIBIANS			
Western spadefoot	*Scaphiopus hammondi*	F-SSC S-SSC	
REPTILES			
Blunt-nosed leopard lizard	*Gambelia sila*	F-Endangered S-Endangered	Regularly observed since 1999
Coast horned lizard	*Phyrnosoma coronatum frontale*	F-SSC S-SSC	Observed in 2003
BIRDS			
Burrowing owl	*Athene cunicularia*	F-SSC	
Swainson's hawk	*Buteo swainsoni (nesting)*	F-SSC S-Threatened	
Northern harrier	*Circus cyanus*	S-SSC (nesting)	Regularly observed since 1999
Loggerhead shrike	*Lanius ludovicianus*	F-SSC S-SSC	Regularly observed since 1999
Horned lark	*Eremphila alpestris actia*	S-SSC	Regularly observed since 1999
MAMMALS			
San Joaquin antelope squirrel	*Ammospermophilus nelsoni*	F-SSC S-Threatened	Observed in 2003 and 2004
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*	F-Endangered S-Endangered	Captured in 1999
Tulare grasshopper mouse	*Onychymus torridus tularensis*	F-SSC S-SSC	
San Joaquin pocket mouse	*Perognathus inornatus inornatus*	F-SSC	
Buena Vista Lake shrew	*Sorex ornatus relictus*	F-Endangered S-SSC	
San Joaquin kit fox	*Vulpes microtus mutica*	F-Endangered S-Threatened	Scat confirmed in 2002 by ESRP

*F=Federal listing status, S=State listing status, CNPS=California Native Plant Society, SSC=Species of Special Concern

**Vertebrate observations from DFG and ESRP unpublished field data; Plant observations from McCormick (2001), DFG and ESRP unpublished field data

C.1 Threatened, Endangered or Rare Plant Species

Heartscale

Heartscale (*Atriplex cordulata*) could potentially occur throughout Buttonwillow ER, although it was not found during botanical surveys conducted in 1999 and 2000 (McCormick 2001).

Crownscale

Crownscale (*Atriplex coronata var coronata*) could potentially occur throughout Buttonwillow ER, although it was not found during botanical surveys conducted in 1999 and 2000 (McCormick 2001).

Lesser Saltscale

The lesser saltscale (*Atriplex minuscula*) is an annual plant that can be found growing on sandy soils in alkaline areas up to 100 meters (330 feet). It tends to grow with other halophytic plants such as bush seepweed, heartscale (*Atriplex cordulata*) and alkali sacaton. Each plant contains many upright, reddish colored stems that can reach 40 cm (16 inches) in height. As with all *Atriplex* species, the individual flowers are inconspicuous due to their very small size and lack of petals.

Management Considerations

The current conservation strategy for this species includes protecting a minimum of five populations of this species throughout its geographic range (USFWS 1998). Each protected area should be at least 160 acres in size, with a minimum of 1000 individuals. There are at least two populations of this species containing over 1000 individuals on Buttonwillow ER, in addition to numerous smaller populations (McCormick 2001). These locations should be monitored on a regular basis to ensure that the numbers are remaining stable.

Subtle Orache

According to the California Natural Diversity Database (DFG 2004), subtle orache (*Atriplex subtilis*) could potentially occur throughout Buttonwillow ER, although it was not found during botanical surveys conducted in 1999 and 2000 (McCormick 2001).

Lost Hills Crownscale

The Lost Hills crownscale (*Atriplex vallicola*), also called Lost Hills saltbush, is a small plant that reaches a maximum height of 20 cm (8 inches). It is mostly found growing with other species of saltbush, along with seepweed and saltgrass, in dried beds of alkaline pools. Its distribution is generally limited to the Carrizo Plain and Lost Hills regions, with a confirmed location approximately 15 miles to the west of Buttonwillow ER.

Management Considerations

This species has not been found on Buttonwillow to date, although suitable habitat exists throughout the ER (McCormick 2001). According to the Recovery Plan for Upland Species of the San Joaquin Valley, if at least 5 distinct populations of this species can be protected, long-term conservation should be assured (USFWS 1998). Surveys for this species should be conducted in spring months, to determine if a viable population exists.

Recurved Larkspur
The recurved larkspur (*Delphinium recurvatum*) can be found in the alkali sink plant communities of the San Joaquin and Sacramento valleys. It has showy white and pale blue colored spurred flowers. Its reddish or purplish colored stem is smooth and hairless. It reaches a height of approximately 90 cm tall and flowers in April and May. Recurved larkspur populations have been observed in Sections 3 and 33 (ESRP observations, McCormick 2001).

Management Considerations
This species may be threatened by overgrazing in addition to habitat conversion. Populations should be located and mapped in detail. A monitoring program should also be implemented in order to track changes in frequency and abundance in response to environmental changes and management actions.

Kern Mallow
The Kern mallow (*Eremalche kernensis*) is associated with alkali saltbush plant communities. It is a small annual plant with stems generally 10 to 40 cm in height, with deeply lobed and irregularly scalloped leaves. Flowers are white to lavender, with blooming typically occurring from March to May. It can be found on soils containing sand or clay at elevations of 95 to 275 meters (315 to 900 feet). All aspects of the life cycle of this plant area highly dependent upon precipitation, as with many arid-land annual plants (USFWS 1998)

Management Considerations
This mallow closely resembles the sympatric non-endangered Parry's mallow (Eremalche parryi); positive identification requires an expert. Locations of suspected occurrences of this species should be recorded using GPS, with prompt follow-up of species identification confirmation by a qualified botantist.

Hoover's Wooly Star
The inconspicuous Hoover's wooly star (*Eriastrum hooveri*) is an annual plant that occurs in alkali sinks and washes in a variety of plant communities. The flowers consist of tiny, white to pale blue flowers that are hidden among tufts of wooly hair. Optimal habitat is characterized as by silty to sandy soils with a protective cryptogamic crust layer and low competing herbaceous cover. However, this species appears to be fairly adaptable, and has also been found in areas without any of the 'optimal' habitat components (USFWS 1998).

Management Considerations

Although this species has been recently removed from the federal list of endangered plants, the California Native Plant Society still considers it a species to “watch”. Also, monitoring of species following delisting actions provides important information about status of the species’ recovery.

Plants of this species were found during botanical surveys conducted in 1999 and 2000 (McCormick 2001). It is recommended by the Recovery Plan that a minimum of 250 Hoover’s woolly star plants be maintained per acre on representative sites (USFWS 1998). Additional populations at Buttonwillow ER should be located, mapped and a monitoring program should be implemented to determine trends in response to precipitation patterns and disturbance.

San Joaquin Wooly Threads

San Joaquin wooly threads (*Lembertia congdonii*) plants are named for their long stems covered with tangled wooly-like hairs. The tiny yellow-colored flower heads are characteristic of the sunflower family to which this species belongs. Crownscale (*Atriplex coronata var coronata*) could potentially occur throughout Buttonwillow ER, although it was not found during botanical surveys conducted in 1999 and 2000 (McCormick 2001).

Management Considerations

San Joaquin wooly threads typically occurs where shrub cover is sparse, 10 percent or less. This species commonly occurs on sandy or sandy loam soils, such as the Kimberlina series found on Buttonwillow ER.

C.2 Threatened or Endangered Animal Species

Blunt-nosed Leopard Lizard

The blunt-nosed leopard lizard is a large-bodied Iguanid with a long, powerful tail and blunt snout. Their background color changes from light gray brown to dark brown according to surrounding soil color and vegetation. All individuals show an alternating pattern of dark spots and light-colored transverse bands on their backs. In breeding season, females develop bright red-orange markings on the head and body, and males develop a salmon color that spreads over the entire underside of the animal (USFWS 1998).

Management Considerations

Bl unt-nosed leopard lizards are known to occur on the ER, and have been regularly observed by DFG personnel since 1999 (Selmon 2004). The Recovery Plan for Upland Species of the San Joaquin Valley suggests a population monitoring program and a range-wide population survey are needed to determine current population sizes and habitat conditions, and to track lizards’ responses to environmental variation and changing land uses (USFWS 1998). Buttonwillow ER provides an ideal location to monitor an isolated but essentially healthy population of this species. An 8.1 hectare survey grid is located near the northern

edge of section 33. Monitoring will be continued on the grid in addition to periodic reconnaissance of additional areas that may contain blunt-nosed leopard lizards.

Although grazing is not currently applied by the DFG as a management tool, the area is trespass grazed by sheep at unknown intervals. The effects of this disturbance on Buttonwillow species has not been quantified, however, blunt-nosed leopard lizards are known to prefer sparsely, vegetated, open habitats. Monitoring should take into account vegetation density, as well as vegetation height and thatch thickness, as these will be affected by an altered grazing regime once the property is fenced. A grazing lease should be established to manage dense non-native grass species when necessary to keep the habitat open.

San Joaquin (Nelson's) Antelope Squirrel

The San Joaquin antelope squirrel is one of five species of antelope squirrel, with characteristic tiny ears and streamlined body with short legs. The tail has a thick fringe of hairs, and the animals are commonly seen with the tail held cocked or curled over the back. They frequently 'flash' their white tails and give a warning call when human presence is detected. This can often be the only means of determining presence of the species without trapping.

Management Considerations

According to the Recovery Plan, San Joaquin antelope squirrels are threatened by habitat fragmentation, use of rodenticides, and overgrazing. Antelope squirrels were observed during reconnaissance for blunt-nosed leopard lizards in 2003 and in 2004 (Selmon 2004). Inventories for San Joaquin antelope squirrels and potential habitat should be conducted to determine their current status on the ER.

Tipton Kangaroo Rat

The Tipton kangaroo rat is one of three subspecies of the Fresno kangaroo rat. Their diet consists primarily of seeds, with a small amount of green herbaceous vegetation and insects. They are found in the arid-land plant communites of the Tulare Lake Basin, on alluvial fan and floodplain soils ranging from fine sands to high salinity clays.

A primary concern for the continued survival of the Tipton kangaroo rat is the species' tendency to succumb to periodic population crashes due to prolonged droughts, excessive precipitation and flooding. Under historic conditions, local population crashes were eventually replaced by nearby, surviving populations. Currently, habitats are so fragmented, that no nearby populations exist to fill in gaps created by local extinctions or crashes (USFWS 1998).

Management Considerations

As with the blunt-nosed leopard lizard, Tipton kangaroo rats prefer short, sparsely vegetated plant communities. A grazing program may be implemented

once the property is fenced to reduce non-native grass and thatch cover. Elevated mounds are another important component of Tipton kangaroo rat habitat. Continued prohibition of off road vehicle use should be maintained by law enforcement to prevent destruction of microtopography and burrows.

San Joaquin Kit Fox

The kit fox is the smallest North American canid, although the San Joaquin subspecies is the largest in the grouop. They have a small, cat-like body with large, close-set ears. The long, bushy tail has a distinct black tip.

The San Joaquin kit fox is an umbrella species for many species of the San Joaquin Valley, as it utilizes nearly all the natural communities used by other valley species. Management designed to benefit the kit fox will also benefit other species occupying narrower niches within a large area of habitat (USFWS 1998). The natural lands of western Kern County make up one of three core areas for kit fox recovery. Though somewhat isolated from important populations in the Elk Hills and Lokern Natural Area, Buttonwillow ER may provide a vital link from surrounding farmland to other nearby protected areas.

Kit foxes have home ranges varying from 1.7 to 4.5 square miles. Kit foxes are relatively mobile species, travelling between 5.8 and 9.1 miles at night (Cypher 2000). Kit foxes have been observed using the ER (DFG unpublished data) and it is probable that the property supports occasional individuals. The fragmented nature and relatively small size may limit the number of kit foxes that can utilize the property year-round, however, it is likely an important stopover location for foraging and dispersing animals.

Management Considerations

Habitat loss, fragmentation and degradation are the primary causes of San Joaquin kit fox decline (USFWS 1998, Cypher 2000). Easy access to the ER allows for habitat degradation and disturbance to occur. In addition, the dumping of livestock carcasses on the ER may indirectly discourage kit fox use as coyotes move in to feed upon the carcasses. Coyotes are known to prey upon and compete with the kit fox for resources (Cypher 2000). Increased coyote populations on the ER may reduce kit fox populations and deter them from foraging and denning on the ER. Clean-up efforts should therefore directly benefit the kit fox.

Buena Vista Lake Shrew

The Buena Vista Lake shrew (*Sorex ornatus relictus*) is thought to be a distinct evolutionary unit of the ornate shrew, and has been listed as endangered under the federal Endangered Species Act. It is also a State species of special concern. It is externally distinguishable from the sympatric *S. ornatus ornatus* due to its grayish-black coloration, larger body size and shorter tail. Shrews forage on insects and other small animals. Their high metabolic rate requires near constant foraging.

Management Considerations
The Buena Vista Lake shrew has historically occurred along swampy margins of Buena Vista, Goose, Kern and Tulare Lakes. Buttonwillow ER is composed primarily of upland, arid habitat. However, there are isolated patches of marginal wetland habitat where Buena Vista Lake shrews may possibly occur. No shrews were observed during surveys conducted by the Endangered Species Recovery Program, 2003. Monitoring should continue to address the possibility of the species occurrence on the ER.

C.3 Other Special Status Animal Species

Western Spadefoot

The western spadefoot (*Scaphiopus hammondii*) is a California State Species of Special Concern, Distinctive features of the western spadefoot include vertical pupils, and black, hardened spades on the heel of each hind foot (Jennings and Hayes, 1994).

The western spadefoot remains in a period of subterranean dormancy until warm (>10-12.8 C) rains of the winter and spring loosen the soil. They remain terrestrial except during breeding season, when the females deposit their eggs in warm (9 C) rain pools, or pools of ephemeral streams. Eggs hatch within 6 days. Larval development requires 3-11 weeks, depending on food availability and temperature (Jennings and Hayes, 1994).

Management Considerations
Threats to the Western spadefoot toad are primarily related to habitat loss and habitat fragmentation. Management actions that maintain or increase abundance and biological diversity of the species on the ER will likely benefit this species.

Coast Horned Lizard

The coast horned lizard (*Phyrnosoma coronatum*) is distributed throughout the San Joaquin Valley and up into the Sacramento valley. They are found in annual grassland habitats, as well as valley-foothill hardwood, conifer and riparian habitats below 1200-1800 meters. Ants and small beetles are major components of the diet of this species, in addition to many other invertebrates.

Management Considerations
A primary management concern for the coast horned lizard on the ER is the availability of native harvester ants. During site visits and field surveys, locations of harvester ant mounds as well as those of argentine and red imported fire ants should be noted. Red imported fire ant populations should be eradicated. A monitoring program to determine distribution and abundance of coast horned lizards could be conducted simultaneously with monitoring for blunt-nosed leopard lizards.

Burrowing Owl
The burrowing owl (*Athene cunicularia*) is a resident of dry, open grassland and is directly associated with burrowing mammals such as the California ground squirrel. Burrowing owls tend to roost and nest in small colonies, in burrows found on sites with short grass, bare ground and perches. They frequently stand at the burrow entrance or perch during the daytime.

Burrowing owls hunt both day and night. Prey items include invertebrates, small birds, amphibians, reptiles and small mammals (Haug, Millsap, and Martell, 1993). Red-tailed hawks, Swainson's hawks, ferruginous hawks, northern harriers, golden eagles, foxes, coyotes, domestic dogs and cats prey upon burrowing owls.

Management Considerations
Rodenticides may indirectly affect owl populations by significantly reducing prey base (CGS control practices-strychnine-coated grain pellets) (Haug, Millsap, and Martell, 1993). Neighboring landowners are known to use poisoned bait to combat California ground squirrels. Periodic checks of bait stations adjacent to ER lands should be conducted to ensure proper use of rodenticide so that owls aren't exposed to illegally used bait or sickened animals.

Swainson's Hawk
The Swainson's hawk (*Buteo swainsoni)* is an uncommon breeding resident and migrant in the Central Valley. They forage in grasslands or grain fields adjacent to riparian areas or oak savannahs. Prey items include ground squirrels, mice, rabbits, reptiles and birds.

Management Considerations
While breeding habitat is not located in the vicinity of the Buttonwillow ER, suitable foraging habitat is present and the species is known to use the ER for that purpose (ESRP unpublished data, McCormick 2001). Management actions that maintain a high abundance and diversity of species on the ER will benefit this species.

Northern Harrier
Northern harriers (*Circus cyaneus)* occur in a variety of habitats from annual grassland on the valley floor to lodgepole pines and alpine meadows. They forage on small mammals such as California voles and ground squirrels, as well as reptiles, birds and insects.

Management Considerations
Management of Buttonwillow ER for a high diversity and abundance of animal species will benefit the northern harrier by providing ample foraging opportunities.

Loggerhead Shrike

The loggerhead shrike is a common resident and winter visitor to valley and foothill areas throughout California. They prefer open habitat with scattered shrubs, trees or other perches. Their prey items consist mainly of insects, but they'll also take small birds, mammals and reptiles. They are known to skewer their prey on sharp twigs or barbed wire, which is where their nickname "butcher birds" comes from.

Management Considerations
Management actions that maintain or increase abundance and biological diversity of the species on the ER will benefit this species.

Horned Lark
The horned lark is commonly seen and/or heard in open habitats with low, sparse vegetation throughout California. It consumes insects and other invertebrates during the breeding season, and seeds and other plant matter during other seasons. Nesting occurs in depressions in the ground that the birds line with grass.

Management Considerations
Maintaining open areas with little grass cover is important for this species' nesting requirements. Management actions that promote biological diversity and maintain open areas on the ER will benefit this species.

San Joaquin Pocket Mouse
The San Joaquin pocket mouse occurs in open grasslands or scrub areas on dry, fine-textured soils. It ranges throughout the Central and Salinas valley. While seeds likely constitute most of the diet of this species, they are also known to consume green vegetation and insects. The pockets referred to in the species' name are actually cheek pouches that are used to carry seed back to their burrows for storage.

Management Considerations
Management actions that maintain or increase abundance and biological diversity on the ER will benefit this species.

Tulare Grasshopper Mouse
Like most mice in the genus *Onychymus,* the Tulare grasshopper mouse (*O. torridus tularensis)* has a stout body with a short, relatively thick tail. It can be distinguished from coexisting species of deermice (*Peromyscus* spp.) by its much shorter tail and larger forefeet. These animals consume mostly insects, although they are known to cache seeds as well (USFWS 1998).

Management Considerations
Management actions that maintain or increase abundance and biological diversity on the ER will benefit this species.

IV. MANAGEMENT GOALS AND ENVIRONMENTAL IMPACTS

A. Definition of Terms Used in This Plan

1. **Element:** an element refers to any biological unit, public use activity, or facility maintenance program as defined below for which goals have been prepared and presented within this plan.
2. **Biological Element:** These elements consist of species, habitats, or communities for which specific management goals have been developed within the plan.
3. **Public Use Element:** Any recreational, scientific, or other use activity appropriate to and compatible with the purposes for which this property was acquired.
4. **Facility Maintenance Element:** A general-purpose element describing the maintenance and administrative program, which helps maintain orderly, and beneficial management of the area.
5. **Biological Goal:** This is the statement of intended long range results of management based upon the feasibility of maintaining, enhancing, or restoring species population and/or habitat.
6. **Public Use Goal:** A public use goal is the statement of the desired type and level of public use compatible with the biological element goals previously specified within the plan.
7. **Tasks:** Tasks are the individual projects or work elements, which implement the goal and are useful in planning operation and maintenance budgets.

B. Biological Elements: Goals, Objectives and Environmental Impacts

Buttonwillow ER contains critical upland habitat for several listed species. Although many listed species have been observed, or have the potential to occur, little to nothing is known about their current abundance and distribution. Management for these species should occur on two levels: Using existing information to guide management decisions while contributing additional data through a monitoring program. Management goals and tasks for listed upland species are based upon recommendations found in the USFWS' Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1998).

B.1 Goals and Objectives

Biological Element 1. Threatened and Endangered Species

San Joaquin kit fox – (FE,CT), Blunt-nosed leopard lizard – (FE,CE), Tipton kangaroo rat – (FE,CE), Buena Vista Lake shrew – (FE), San Joaquin antelope squirrel – (CT); **Species of Special Concern:** Hoover's woolly star, San Joaquin wooly-threads, Kern mallow, Recurved larkspur, Lesser saltscale, Heartscale,

Crownscale, Lost Hills crownscale, Coast horned lizard, Western spadefoot, California horned lark, Burrowing owl, Loggerhead shrike, Swainson's hawk, Northern harrier, San Joaquin pocket mouse, Tulare grasshopper mouse

Goal: To maintain/expand populations of sensitive species on the Reserve by appropriately managing and improving habitat where necessary.

Objective 1. Manage vegetation communities with grazing to maintain habitat conditions favorable to sensitive species.

Tasks

1. Determine an appropriate level and type of grazing (cow vs. sheep).
2. Establish a grazing lease to manage vegetative cover when needed.
3. Conduct pre and post-grazing monitoring to maintain desired vegetation composition and abundance.

Objective 2. Monitor populations of T&E species as needed to determine population status and assess species' response to management actions.

Tasks

1. Conduct surveys for the San Joaquin antelope squirrels to determine population distribution and abundance (minimum of once every 3 years).
2. Conduct small mammal trapping to assess populations of Tipton kangaroo rats (minimum of once every 3 years).
3. Conduct surveys for San Joaquin kit fox sign such as dens and scat to determine if the species is continuing to use the ER (minimum of once every 3 years).
4. Conduct surveys for Buena Vista lake shrews to determine if the species exists on the ER (minimum of once every 3 years).
5. Conduct transect or grid surveys for blunt-nosed leopard lizards (minimum of once every 3 years).
6. Conduct surveys for sensitive plant species (minimum of once every 3 years).
7. Conduct reconnaissance surveys as needed to locate sites for long-term monitoring of T&E species.**Biological Element 2. Vernal Playas**

Goal: To protect these sensitive resources and the species that depend on them.

Objective 1. Locate, map and monitor seasonally inundated vernal playas.

Tasks

1. Visit Buttonwillow Ecological Reserve in late winter/early spring months to locate and map seasonally inundated pools.
2. Sample vernal pool invertebrates to determine species

composition.
3. Monitor vernal pools once every 3-5 years for sensitive species
4. Check on status of pools on annual basis to ensure no illegal dumping of harmful substances has occurred.
5. Map and monitor extent of cryptogamic crusts formed on dry playa surfaces.

Biological Element 3. Valley Saltbush Scrub/Mixed *Atriplex* Series
Goal: To protect and, where appropriate, expand the distribution of this rare native plant community.

Objective 1. Determine habitat conditions and management actions needed to maintain or expand this community.

Tasks

1. Map the extent of the rare valley saltbush plant community.
2. Monitor the plant community periodically to ensure it persists or expands.
3. Establish these native plants in disturbed areas where appropriate.

Biological Element 4. Alkali Sacaton Series
Goal: To protect and, where appropriate, expand the distribution of this rare native plant community.

Objective 1. Determine habitat conditions and management actions needed to maintain or expand this community.

Tasks

4. Map the extent of the rare alkali sacaton plant community.
5. Monitor the plant community periodically to ensure it persists or expands.
6. Establish this species in disturbed areas where appropriate.

Biological Element 5. Degraded Sensitive Habitat

Goal: Improve degraded habitat with clean-up efforts and eradication of invasive species.

Buttonwillow ER has become a popular site for illegal dumping. Items such as refrigerators, water tanks, auto parts, tires, barrels, furniture, and livestock carcasses have been dumped throughout the property. The majority of the dumping has occurred in Section 33 along the western road, and along the northern edge of section 29. To a lesser extent, debris is scattered in Section 3.

Objective 1. Remove garbage, carcasses, and hazardous substances that may negatively impact sensitive species.

Tasks

1. Conduct a thorough site reconnaissance prior to initiating a clean-up effort to identify area to be cleaned up.
2. Survey the areas to be cleaned up with a hazardous materials specialist to ensure that volunteers aren't exposed to toxins.
3. Flag and otherwise block off areas that contain known or suspected hazards.
4. Survey the areas to be cleaned up for sign of any sensitive plant or animal species.
5. Flag all areas with known or suspected sensitive species for complete avoidance.
6. Determine routes of entry and exit to clean-up sites that will minimize impact to the habitat.

Objective 2. Identify and eliminate noxious and invasive species that could negatively impact the resident native species, particarly sensitive species.

Tasks

1. Locate and map invasive plant and invertebrate species
2. Determine best methods to eradicate non-native species without negatively impacting sensitive plant or animal species
   a. Contact California Department of Food and Agriculture's red imported fire ant eradication program at 1-888-4fireant (1-888-434-7326).
3. Conduct eradication programs as needed, taking precautions to avoid negative impacts to sensitive plant and animal species.
4. Monitor for reoccurrence of invasive species.

Biological Element 4. Habitat Biodiversity and Sustainability

Goal: To protect existing high level of biological diversity by ensuring long-term sustainability though acquisition of adjacent and nearby lands.

Objective 1. Prepare a Conceptual Area Protection Plan for the Buttonwillow Ecological Reserve vicinity to facilitate acquisitions from willing sellers.

Tasks

1. Identify remaining natural lands in the vicinity of the Reserve that could be used to expand the current boundaries and link with other natural areas

2. Follow the Department guidelines on preparation of Conceptual Area Protection Plan documents (DFG 1999).

B.2 Environmental Impacts

No significant environmental impacts will result from the Department's management of Buttonwillow ER as described in this Section (See Appendix C – CEQA Environmental Checklist).

C. Public Use Elements: Goals and Environmental Impacts

C.1 Goals and Objectives

Public Use Element 1. Public access for environmental education

Goal: Implement an effective interpretive program designed to increase public awareness of the importance of conserving southern San Joaquin Valley plant and animal communities.

Objective 1. Design an interpretive program that would educate the public about the Reserve and its species.

Buttonwillow is an increasingly rare example of the landscape that once dominated the southern San Joaquin Valley. Guided tours conducted by DFG personnel or authorized experts may focus on the ecology and natural histories of the flora and fauna, and unique beauty of the landscape. Activities such as wildflower walks, bird watching, and photography would provide quality educational opportunities for local school groups, California Native Plant Society (CNPS) chapters, Sierra Club chapters, and interested parties. Because Buttonwillow ER contains habitat for listed species, guides should conduct tours in order to prevent inadvertent disturbance to species or fragile microhabitats. Guided tours will become a necessity when the property is fenced and signed, as access will be limited to DFG personnel.

Tasks

1. Design and implement interpretive program to include guided activities such as but not limited to:
    - Plant identification and wildflower classes
    - Birdwatching tours
    - Photography classes

C.2 Environmental Impacts

No significant environmental impacts will result from the Department's management of Buttonwillow ER as described in this Section (See Appendix C – CEQA Environmental Checklist).

D. Facility Maintenance Elements: Goals and Environmental Impacts

Facility Maintenance Element 1. Fencing and trespass control

Goal: To maintain the property in an undisturbed condition by preventing illegal trespass.

Objective1. Use fencing and frequent patrols to minimize trespass impacts.

Tasks

1. Establish priorities for fencing to decrease or eliminate access to the Reserve by unauthorized persons.
2. Visit the Reserve on a bi-weekly basis to check for new trespass issues.
3. Repair fence breaks and remove trash as quickly as possible to prevent additional encroachment.

D.2 Environmental Impacts

No significant environmental impacts will result from the Department's management of Buttonwillow ER as described in this Section (See Appendix C – CEQA Environmental Checklist).

V. OPERATIONS AND MAINTENANCE SUMMARY

A. Operations and Maintenance Tasks to Implement Plan

A breakdown of operations and maintenance tasks needed to manage the Buttonwillow ER is presented in Table 2. Approximate number of days needed to complete various tasks with an optimally sized staff is ultimately converted to PY's, or personnel-years, for easy budgeting. The actual numbers of days currently available to manage the area are also shown in the table, and are based on the amount of time allocated to the ER in fiscal year 2003-2004.

B. Existing Staff and Additional Personnel Needs Summary

As one can see by looking at the level of staffing currently available to manage the ER (highlighted in yellow), compared with what is needed to adequately manage and monitor the sensitive species and their habitats (optimal staffing), additions to the staff are clearly needed. The current dire budget situation has left little funds for managing ecological reserves that don't have endowment income. Although Buttonwillow ER contains high quality habitat and surprising numbers of threatened animals and plants for its relatively small size, even basic biological monitoring is almost impossible to conduct due to costs involved with travel and surveys to the site.Additonal high quality habitat still exists in the general vicinity of Buttonwillow ER, and a CAPP should be prepared which facilitates easy acquisition of parcels should they become available for sale in the future.

Table 2. Operations and Maintenance Summary

Element	Task	Priority	Personnel Classification	Days W/Current Staff	Labor (in days)		Initial Cost	Ongoing Cost
					Initial	Ongoing		
BIOLOGICAL								
T&E and Other Sensitive Species	1) Determine Appropriate Grazing Regime	1	ABB		5	1		
	2) Establish Grazing Lease	2	ABB		2	1		
	3) Conduct Pre and Post-Grazing Monitoring to Maintain Desired Vegetation Composition and Abundance	2	ABB		3	2		
			SCI		6	6		
	4) Conduct Surveys for SJAS (every 3 year min)	1	ABW		5	2	1000	200
			SCI		10	10		
	5) Conduct Surveys for Tiptons's (every 3 yr min)	1	ABW		5	2	1000	200
			SCI		10	10		
	6) Conduct Surveys for SJKF dens/sign (every 3 yr min)	1	ABW		2	2		
			SCI		6	6		
	7) Conduct Surveys for BVLS (every 3 yr min, opportunistically)	1	ABW		2	2	1000	200
			SCI		6	6		

Table 2. Operations and Maintenance Summary (continued)

Element	Task	Priority	Personnel Classification	Days W/Current Staff	Labor (in days)		Initial Cost	Ongoing Cost
					Initial	Ongoing		
BIOLOGICAL								
T&E and Other Sensitive Species	8) Conduct Surveys for BNLL (every 3 yr min)	1	ABW	1	2	2		
			SCI	8	20	20		
	9) Conduct Surveys for Sensitive Plant Species (every 3 yr min)	1	ABB		2	2		
			SCI		6	6		
	10) Conduct Reconnaissance Surveys for New Sensitive Species Monitoring Locations (every 7-10 yrs or as needed)	2	ABW or ABB	1	2	2		
Vernal Playas	1) Locate and Map Vernal Playas	1	SCI		10			
	2) Sample Vernal Pool Invertebrates to Determine Species Composition	1	ABW		4	2		
	3) Monitor Vernal Pools for Sensitive Species (every 3 yr min)	2	SCI		4	2		
	4) Monitor Cryptogamic Crust (every 3 yr min)	2	SCI		4	2		

Table 2. Operations and Maintenance Summary (continued)

Element	Task	Priority	Personnel Classification	Days W/Current Staff	Labor (in days)		Initial Cost	Ongoing Cost
					Initial	Ongoing		
BIOLOGICAL								
Valley Saltbush Scrub/Mixed Atriplex Series	1) Locate and Map the Extent of This Plant Community w/GPS	2	SCI		3			
	2) Determine Management Actions (if any) Needed to Maintain This Plant Community	2	ABB		1	1		
	3) Establish This Plant Community As Appropriate in Disturbed Areas	2	SCI		2	2		
Alkali Sacaton Series	1) Locate and Map the Extent of This Plant Community w/GPS	2	SCI		3			
	2) Determine Management Actions (if any) Needed to Maintain This Plant Community	2	ABB		1	1		
	3) Establish This Plant Community As Appropriate in Disturbed Areas	2	SCI		2	2		

Table 2. Operations and Maintenance Summary (continued)

Element	Task	Priority	Personnel Classification	Days W/Current Staff	Labor (in days)		Initial Cost	Ongoing Cost
					Initial	Ongoing		
BIOLOGICAL								
Degraded Sensitive Habitat	1) Conduct a Site Reconnaissance to ID Target Areas	1	ABW	2	2	1		
	2) Survey Sites with HazMat Specialist to ID Potential Hazards		ABW		1			
		1	CON		1		2000	
	3) Flag or Otherwise Block-Off Any Hazards	1	SCI		2			
	4) Survey the Target Sites for T&E Species	1	ABW		5			
			SCI		20			
	5) Flag or Otherwise Block-Off all Areas with Known Or Suspected T&E Species	1	SCI		2			
	6) Demarcate Best Routes of Entry to Sites to Minimize Impacts to Habitat and Species	1	SCI		2			
	7) Locate and Map Invasive Plant or Animal Species (every 3 yr min)	1	ABB or ABW		1	1		
		1	SCI		4	2		
	8) Determine Best Methods to Eradicate Identified Non-Native Species	1	ABB or ABW		1	1		
	9) Conduct Non-Native Species Eradication Program (as needed)	1	ABB or ABW		1	1	250	250
			SCI		4	4		
	10) Monitor for Reoccurrence of Invasive Species	10	ABB or ABW		1	1		
			SCI		2	2		

Table 2. Operations and Maintenance Summary (continued)

Element	Task	Priority	Personnel Classification	Days W/Current Staff	Labor (in days)		Initial Cost	Ongoing Cost
					Initial	Ongoing		
BIOLOGICAL								
Habitat Biodiversity and Sustainability	4) Contact CDFA Red Ant Eradication Program and Develop a RIFA Plan for the ER	1	ABB or ABW		3			
	5) Identify Natural Lands in Vicinity of the ER that Could be Used to Expand and Link with Other Areas	1	ABB or ABW		4	2		
	6) Follow DFG Guidelines for Conceptual Area Protection Plan (CAPP) Development and Prepare a CAPP for Submission to WCB	1	ABB or ABW		10			
PUBLIC USE								
Environmental Education	1) Design Program to Provide Research and Educational Opportunities (ie. T&E Species Training Courses, Birdwatching, Photography)	2	ABB or ABW		5			

Table 2. Operations and Maintenance Summary (continued)

Element	Task	Priority	Personnel Classification	Days W/Current Staff	Labor (in days)		Initial Cost	Ongoing Cost
					Initial	Ongoing		
FACILITY MAINTENANCE								
Fences	1) Establish Priorities for Fencing to Eliminate Unauthorized Access	1	WHS		1			
	2) Fence the Property & Place Signs every 1/4 to 1/8th of mile	1	WHA		10		$40,000	
			SEA		40			
	3) Visit the ER Bi-weekly to Check for Fence Breaks and New Trespass Issues	1	WHA	12	25	25		
	4) Repair Fence Breaks and Remove Trash as Needed		WHA		1	1		
		1	SEA		6	6		500
					COST TOTALS		**$45,250.00**	**$1,350.00**

PERSONNEL CODES		LABOR TOTALS	Current Staffing	TOTAL DAYS (Optimal Staffing)	TOTAL PY'S (Optimal Staffing)
CON	CONTRACTOR	CON		1	
SCI	SCIENTIFIC AIDE	SCI	8	265	
SEA	SEASONAL AIDE	SEA			
ABB	ASSOC. BIOLOGIST-BOTANY	ABB		44	
ABW	ASSOC. BIOLOGIST-WILDLIFE	ABW	4	58	
WHS	WILDLIFE HABITAT	WHS	12	61	

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Appendix A

Common Plant Species with Potential to Occur at the Buttonwillow Ecological Reserve

Family	Common Name	*Scientific name*	State & Federal Status	CNPS List
Aizoaceae	Western sea purslane	*Sesuvium verrucosum*		
Amaranthaceae	Palmer careless weed	*Amaranthus palmeri*		
Apiaceae	Rattlesnake weed	*Daucus pusillus*		
Asteraceae	**Russian knapweed**	***Acroptilon repens***	**NW**	
Asteraceae	**Tocalote**	***Centaurea melitensis***		
Asteraceae	**Pineapple weed**	***Chamomilla suaveolens***		
Asteraceae	Horseweed	*Conyza canadensis*		
Asteraceae		*Conyza coulteri*		
Asteraceae		*Filago californica*		
Asteraceae	Spikeweed	*Hemizonia pungens*		
Asteraceae	Pale-leaf golden bush	*Isocoma acradenia*		
Asteraceae	**Prickly lettuce**	***Lactuca serriola***		
Asteraceae	Goldfields	*Lasthenia californica*		
Asteraceae	Alkali daisy	*Lasthenia ferrisae*		List 4
Asteraceae		*Layia pentachaeta* ssp. *albida*		
Asteraceae	Shrubby alkali aster	*Machaeranthera carnosa*		
Asteraceae	Snakes heads	*Malacothrix coulteri*		
Asteraceae		*Microseris campestris*		
Asteraceae	**Common groundsel**	***Senecio vulgaris***		
Asteraceae	Common sow thistle	*Sonchus oleraceus*		
Asteraceae	Everlasting nest straw	*Stylocline gnaphaloides*		
Asteraceae	Silver puffs	*Uropappus lindleyi*		
Asteraceae	Cockle bur	*Xanthium strumarium*		
Boraginaceae		*Amsinckia menziesii* var. *menziesii*		
Boraginaceae		*Heliotropium curassavicum*		
Boraginaceae		*Pectocarya penicillata*		
Boraginaceae	Adobe allocarya	*Plagiobothrys*		

Family	Common Name	*Scientific name*	State & Federal Status	CNPS List
		acanthocarpa		
Boraginaceae		*Plagiobothrys bracteatus*		
Brassicaceae	**Black mustard**	***Brassica nigra***		
Brassicaceae	**Sheperd's purse**	***Capsella bursa-pastoris***		
Brassicaceae	California mustard	*Guillenia lasiophylla*		
Brassicaceae		*Hutchinsia procumbens*		
Brassicaceae		*Lepidium dictyotum*		
Brassicaceae	Common peppergrass	*Lepidium nitidum*		
Brassicaceae	Charlock	*Sinapsis arvensis*		
Brassicaceae	**London rocket**	***Sisymbrium irio***		
Caparraceae	Jackass clover	*Wislizenia refracta*		
Caryophyllaceae		*Herniaria hirsuta* ssp. *cinerea*		
Caryophyllaceae		***Spergularia bocconii***		
Caryophyllaceae		*Spergularia macrotheca* var. *leucantha*		
Caryophyllaceae		*Spergularia marina*		
Chenopodiaceae	Iodine bush	*Allenrolfea occidentalis*		
Chenopodiaceae	Heartscale	*Atriplex cordulata*		1B
Chenopodiaceae	Crownscale	*Atriplex coronata*		List 4
Chenopodiaceae	Lesser saltscale	*Atriplex miniscula*		1B
Chenopodiaceae	Arrowscale	*Atriplex phylostegia*		
Chenopodiaceae	Common saltbush	*Atriplex polycarpa*		
Chenopodiaceae	Spiny saltbush	*Atriplex spinifera*		
Chenopodiaceae	Lost Hills crownscale	*Atriplex vallicola*		1B
Chenopodiaceae	**Fivehook**	***Bassia hyssopifolia***		
Chenopodiaceae	**Lamb's quarters**	***Chenopodium album***		
Chenopodiaceae		*Kochia californica*		
Chenopodiaceae		*Nitrophila occidentalis*		
Chenopodiaceae	Greasewood	*Sarcobatus vermiculatus*		
Chenopodiaceae	Bush seepweed	*Suaeda moquinii*		
Crassuclaceae	Pygmy weed	*Crassula connata*		
Cuscutaceae		*Cuscuta californica* var. *californica*		
Cuscutaceae		*Cuscuta salina*		
Cyperaceae		*Eleocharis macrostachya*		
Cyperaceae		*Scirpus maritimus*		
Liliaceae	**Sweet clover**	***Melilotus indica***		
Liliaceae	Alkali heath	*Frankenia salina*		

Family	Common Name	*Scientific name*	State & Federal Status	CNPS List
Geraniaceae	**Red-stemmed filaree**	***Erodium cicutarium***		
Hydrophyllaceae		*Phacelia fremontii* (c.f.)		
Lamiaceae	**Horehound**	***Marrubium vulgare***		
Liliaceae		***Asparagus officinalis* ssp. *officinalis***		
Liliaceae	Blue dicks	*Dichelostemma capitatum*		
Loasaceae		*Mentzelia affinis*		
Malvaceae	**Cheeseweed**	***Malva parviflora***		
Plantaginaceae		*Plantago elongata*		
	Indian wheat	*Plantago erecta*		
Poaceae	**Slender wild wheat**	***Avena barbata***		
Poaceae	**Soft chess**	***Bromus hordeaceus***		
Poaceae	**Red brome**	***Bromus madritensis* ssp. *rubens***		
Poaceae	Annual hairgrass	*Deschampsia danthonioides*		
Poaceae	Saltgrass	*Distichlis spicata*		
Poaceae	Low barley	*Hordeum depressum*		
Poaceae		***Koeleria phleoides***		
Poaceae	**Mexican sprangletop**	***Leptochloa uninervia***		
Poaceae	Alkali rye	*Leymus triticoides*		
Poaceae	**Perennial ryegrass**	***Lolium perenne***		
Poaceae		***Phalaris minor***		
Poaceae	**Annual beard grass**	***Polypogon monspeliensis***		
Poaceae		***Schismus barbatus***		
Poaceae	Alkali sacaton	*Sporobolus airoides*		
Poaceae		*Vulpia microstachys*		
Poaceae		***Vulpia myuros***		
Polemoniaceae	Hoover's wooly star	*Eriastrum hooveri*		4
Polemoniaceae	Many-flowered eriastrum	*Eriastrum pluriflorum*		
Polemoniaceae	Bird's eye gilia	*Gilia tricolor*		
Polygonaceae		*Eriogonum gracillimum*		
Polygonaceae		*Goodmania luteola*		List 4
Polygonaceae	**Sheep sorrel**	***Rumex acetosella***		
Polygonaceae	**Curly dock**	***Rumex crispus***		
Ranunculaceae	Recurved larkspur	*Delphinium recurvatum*		1B

Family	Common Name	*Scientific name*	State & Federal Status	CNPS List
Resedaceae		*Oligomeris linifolia*		
Scrophulariaceae	Valley tassels	*Castilleja attenuata*		
Scrophulariaceae	Pursland speedwell	*Veronica peregrina* ssp. *xalapensis*		
Solanaceae		*Physalis acutifolia*		
Tamaricaceae	**Tamarisk**	***Tamarix ramosissima***		

Table Resources: McCormick (2001), DFG and ESRP field observations.
Status Codes: FE – Federal Endangered, FT – Federal Threatened, CE – State Endangered, CT – State Threatened, CSC – State Species of Special Concern, FPE – Federally Proposed Endangered, FPT – Federally Proposed Threatened, FCS – Federal Candidate Species, NW - Noxious Weed, H - Harvest Species, CNPS 1B – Rare or Endangered in California and Elsewhere. CNPS List 4 – Plants of Limited Distribution (Watch List). **Bolded text – exotic species**.

Appendix B

Animal Species with Potential to Occur on the Buttonwillow Ecological Reserve

Common Name	Scientific Name	Status	Observed On BER
INVERTEBRATES			
	Linderiella occidentalis		
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	
AMPHIBIANS			
Western toad	*Bufo borealis*		X (Tracks only)
REPTILES			
Blunt-nosed leopard lizard	*Gambelia sila*		X
Coast horned lizard	*Phrynosoma coronata*		X
Coachwhip	*Masticophis flagellum* ssp. *ruddocki*		
Desert night lizard	*Xantusia vigilis* ssp.*vigilis*		
Western rattlesnake	*Crotalus viridis*		X
Side blotched lizard	*Uta stansburiana*		X
Western fence lizard	*Sceloperous occidentalis*		
Western whiptail	*Cnemidophorus tigris*		X
BIRDS			
Great blue heron	*Ardea herodias*		
Black crowned night heron	*Nycticorax nycticorax*		X
Great egret	*Ardea alba*		X
Snowy egret	*Egretta thula*	FSC	
Cattle egret	Bubulcu ibis		
White-faced ibis	*Plegadis chihi*	FSC, SSC	
Canada goose	*Branta Canadensis*		
Mallard	*Anas platyrhynchos*		
Gadwall	*Anas strepera*		
Northern pintail	*Anas acuta*		
American widgeon	*Anas Americana*		
Northern shoveler	*Anas clypeata*		
Cinnamon teal	*Anas cyanoptera*		
Northern harrier	*Circus cyaneus*	SSC	X
White-tailed kite	*Elanus leucurus*	FSC	X
Swainson's hawk	*Buteo swainsoni*	FSC, ST	X
Red-tailed hawk	*Buteo jamaicensis*		X
Ferruginous hawk	*Buteo regalis*	FSC, SSC	
Golden eagle	*Aquila chrysaetos*	SSC, FP	X
Merlin	*Falco colombarius*	SSC	
American kestrel	*Falco sparverius*		X
Prairie falcon	*Falco mexicanus*	SSC	X
Peregrine falcon	*Falco peregrinus*	FSC, SE,	

Common Name	Scientific Name	Status	Observed On BER
		FP	
California quail	*Callipepla californica*		
Ring-necked pheasant	*Phasianus colchicus*		
American coot	*Fulica Americana*		
Sandhill crane	*Grus Canadensis*	ST, FP	
Mountain plover	*Charadrius montanus*	FPT, SSC	
Killdeer	*Charadrius vociferous*		X
American avocet	*Recurvirostra Americana*		X
Black-necked stilt	*Himantopus mexicanus*		X
Greater yellowlegs	*Tringa melanoleuca*		X
Long-billed curlew	*Numenius americanus*	FSC, SSC	X
Common snipe	*Gallinago gallinago*		X
Mourning dove	*Zenaida macroura*		X
Rock dove	*Columbia livia*		X
Greater roadrunner	*Geococcyx californianus*		X
Barn owl	*Tyto alba*		
Long-eared owl	*Asio otus*		
Short-eared owl	*Asio flammeus*	SSC	
Great-horned owl	*Bubo virginianus*		
Burrowing owl	*Athene cunicularia hypugea*	FSC, SSC	X
Northern flicker	*Colaptes auratus*		
Black phoebe	*Sayornis nigricans*		X
Western kingbird	*Tyrannus verticalis*		
Loggerhead shrike	*Lanius ludovicianus*	FSC, SSC	X
Common raven	*Corvus corax*		X
American crow	*Corvus brachyrhynchos*		X
Horned lark	*Eremophila alpestris*	SSC	X
Northern rough-winged swallow	*Stelgidopteryx serripennis*		
Tree swallow	*Tachycineta bicolor*		
Cliff swallow	*Petrochelidon pyrrhonota*		
Barn swallow	*Hirundo rustica*		X
Savannah sparrow	*Passerculus sandwichensis*		X
Sage sparrow	*Amphispiza belli*		X
Song sparrow	*Melospiza melodia*		
Western meadowlark	*Sturnella neglecta*		X
Brown-headed cowbird	*Molothrus ater*		
Yellow-headed blackbird	*Xanthscephalus xanthocephalus*		
Tricolored blackbird	*Agelaius tricolor*	FSC, CSC	
Red-winged blackbird	*Agelaius phoeniceus*		
Brewer's blackbird	*Euphagus cyanocephalus*		
Northern mockingbird	*Mimus polyglottos*		X

Common Name	Scientific Name	Status	Observed On BER
European starling	*Sturnus vulgaris*		
American pipit	*Anthus rubescens*		X
MAMMALS			
Ornate shrew	*Sorex ornatus* ssp. *Relictus*	FE	
Broad-footed mole	*Scapanus latimanus*		
Little brown myotis	*Myotis lucifugus*		
Yuma myotis	*Myotis yumanensis*	FSC	
Western red bat	*Lasiurus Blossevillii*		
Spotted bat	*Euderma maculatum*	FSC, SSC	
Townsend's big-eared bat	*Plecotus townsendii*	FSC, SSC	
Pallid bat	*Antrozous pallidus*		
Western mastiff bat	*Eumops perotis*	FSC, SSC	
Desert cottontail	*Sylvilagus audubonii*	H	X
Black-tailed jackrabbit	*Lepus californicus*	H	X
San Joaquin antelope squirrel	*Ammospermopilus nelsoni*	FSC, SSC	X
San Joaquin pocket mouse	*Perognathus inornatus*	FSC	
California pocket mouse	*Chaetodipus californicus*		
Heerman's kangaroo rat	*Dipodomys heermanni*		X
Fresno kangaroo rat	*Dipodomys nitratoides*	SE, FE	
Tipton kangaroo rat*	*Dipodomys nitratoides nitratoides*	SE, FE	X
Deer mouse	*Peromyscus maniculatus*		X
Southern grasshopper mouse	*Onychomys torridus*	FSC, SSC	
California vole	*Microtus californicus*		
Coyote	*Canis latrans*	H	X
Red fox	*Vulpes vulpes*	H	
Kit fox	*Vulpes macrotis mutica*	FE, ST	X
Gray fox	*Urocyon cinereoargenteus*	H	
Raccoon	*Procyon lotor*	H	
Long-tailed weasel	*Mustela frenata*		X
American badger	*Taxidea taxus*		
Striped skunk	*Mephitis mephitis*	H	
Mountain lion	*Felis concolor*		
Bobcat	*Lynx rufus*		
Wild pig	*Sus scrofa*		

Table Resources: CNDDB, CWHR version 8.0, DFG and ESRP field observations.
Status Codes*:* FE – Federal Endangered, FT – Federal Threatened, SE – State Endangered, ST – State Threatened, SSC – State Species of Special Concern, FPE – Federally Proposed Endangered, FPT – Federally Proposed Threatened, FSC – Federal Species of Concern, FP – Fish and Game Fully Protected Species, NW - Noxious Weed,

H - Harvest Species.

APPENDIX C

Environmental Checklist